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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/802,734

03/18/2004

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5050

7590 10/10/2008
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EXAMINER

GOLUB, MARCIA A

ART UNIT

PAPER NUMBER

2828

MAIL DATE

DELIVERY MODE

10/10/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Arguments

Applicant's arguments have been considered but they are not persuasive.

Regarding applicant's argument that '983 discloses two distinct lasers and not a single semiconductor waveguide cavity. The examiner points out that the separate laser elements form one ring laser. Since the light produced in one segment is returned to that segment for additional amplification, the two laser elements can be considered to be part of the same laser cavity.

Regarding applicant's arguments that facets 190 and 192 define a gap separating two lasers and not a gap separating one cavity, the examiner points out that claim 25 recited facets on the gap separating two sections of a laser cavity. The claims do not define a laser cavity in such a way as to overcome the prior art.

Regarding applicant's arguments that '029 discloses a structure that is formed by bonding two semiconductors together and does not disclose a single epitaxial structure, the examiner points out a) "epitaxial" is a product by process limitation that does not have a patentable weight in a device claim, b) just because the two parts are bonded together does not mean that there are two separate structures present. The two parts are bonded together to form one laser structure.

Regarding applicant's argument that '029 does not disclose an etched DBR, the examiner points out a) the claim does not disclose a specific DBR structure b) "etched" is a product by process limitation that does not have a patentable weight in a device claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Sirbu et al. (6,546,029), hereinafter '029.

Fig 3 of '029 discloses a semiconductor laser, comprising:

1. "a substrate [11];
an epitaxial structure [100] deposited on said substrate; ("epitaxial" and "etched" are product by process limitations that do not have a patentable weight in a device claim, same reasoning applies to gap and DBR below and to other claims)
a semiconductor laser cavity [14] formed in said epitaxial structure, said cavity having at least one segment [extending from 18 to 27] and at least one output [12];
at least one etched gap [16] extending through said at least one segment and separating said segments into first [18] and second [27] spaced apart sections;
and at least one distributed Bragg reflector (DBR) [12] etched in said epitaxial structure at said at least one output.
3. "wherein said at least one laser cavity segment [100] includes an active region [27] and said gap [16] comprises spaced-apart facets extending through said active region, (facet is defined as a small plane surface and therefore meets the limitation of the claim)
and wherein said gap has a length of between about 0.001 um and about 10 um [1.5 um]." (4/56)
25. "a substrate [11];
an epitaxial structure [100] deposited on said substrate;
a semiconductor waveguide cavity [14] formed in said epitaxial structure having at least one segment [extending from 18 to 27];
an etched gap [16] extending through said semiconductor waveguide cavity in said at least one segment and separating said segments into first [18] and second [27] spaced apart sections, said etched gap comprising a pair of parallel etched facets [defined by layers 18 and 34] spaced apart by a length of between about 0.001 um and 10 um [1.5 um]." (4/56)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 6, 25, 26, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belfar-Rad (5,132,983) hereinafter '983, and further in view of Evans et al. (4,952,019) hereinafter '019.

Figs 5, 16 and 17 of '983 discloses:

1. "a substrate [294];
an epitaxial structure [waveguide ring laser] deposited on said substrate;
("epitaxial" and "etched" are product by process limitations that do not have a patentable weight in a device claim, same reasoning applies to gap and DBR below and to other claims)

a semiconductor laser cavity formed in said epitaxial structure, said cavity having at least one segment [70, 10] and at least one output [76];

at least one etched gap [d, space between 73 and 34] extending through said at least one segment and separating said segments into first [70] and second [10] spaced apart sections;

'983 discloses a reflector at the output face but does not disclose:

"at least one distributed Bragg reflector (DBR) at said at least one output."

However DBRs are well known in the art as evidenced by Fig 1 of '019.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '019 into the device of '983 by making the reflector at the output face a DBR for at least the purpose of providing wavelength selective feedback into the laser cavity.

6. "wherein the laser cavity includes two segments [segments 180 in Fig 16] joined at an etched output facet [190,192], said at least one etched gap [d] in at least one

segment providing improved unidirectionality.” (9/51-55)

Fig 16 of '983 and Fig 1 of '019 discloses a semiconductor device comprising:

25. “a substrate [294];
an epitaxial structure [waveguide ring laser] deposited on said substrate;
a semiconductor waveguide cavity formed in said epitaxial structure, said cavity having at least one segment [70, 10, 180];
an etched gap [space between 190 and 192, or between 773 and 34] extending through said semiconductor waveguide cavity in said at least one segment and separating said segments into first [70] and second [10] spaced apart sections, said etched gap comprising a pair of parallel etched facets [190,192, 73, 34] spaced apart by a length [d].”

'983 does not disclose the length d to be “between about 0.001 um and 10 um.” However, '983 discloses adjusting the length of the gap in order to improve operation in a counterclockwise direction. (9/51-55)

It would have been obvious to one of ordinary skill in the art to find the optimum length for the gap, since the courts have held that optimization of range is not inventive unless it is accompanied by unexpected results, see MPEP 2144.05

26. “further including multiple etched gaps [d] spaced along said waveguide cavity.”
31. “a semiconductor laser cavity [280] having multiple segments [180] joined end-to-end at an etched facet to provide a laser output;
and at least one etched gap [190, 192] extending through at least one segment.
32. “further including a DBR [14] located externally of said laser cavity and adjacent said output etched facet.”

Conclusion

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB whose telephone number is (571)272-8602. The examiner can normally be reached on M-Th 9:30-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Marcia A. Golub-Miller/

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